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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/700,991	11/03/2003	Vahid Tarokh	MN1-004US	5626

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EXAMINER	
LAM, DUNG LE	
ART UNIT	**PAPER NUMBER**
2687	

DATE MAILED: 09/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/700,991	TAROKH ET AL.	
	Examiner	Art Unit	
	Dung Lam	2687	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-80* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-11,32,33,41-46,48-51,72 and 73* is/are rejected.

7)☒ Claim(s) *7, 12, 17-31, 34-40, 47, 52,57-71, and 74-80* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1-3** are rejected under 35 U.S.C. 102(b) as being anticipated by **Katz** (US Patent No. 6,393,303).

3. Regarding **claim 1**, **Katz** teaches a method for use in a wireless communication system, the method comprising: outputting at least one signal suitable for causing a smart antenna (SDMA) to transmit at least one complementary beam (auxiliary beam Col. 2, lines 55-65).

4. Regarding claim **2**, **Katz** teaches all the limitations in claim 1. **Katz** further teaches that said smart antenna transmits said at least one complementary beam based on said at least one signal (Col. 2, lines 55-65).

5. Regarding claim **3**, **Katz** teaches all the limitations in claim 2. **Katz** further teaches that said at least one signal is operatively configured to cause said smart

antenna to perform single beam complementary beamforming (auxiliary beam col. 2, lines 55-65).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim **4-6,8 are** rejected under 35 U.S.C. 103(a) as being unpatentable over **Katz et al.** (US Patent No. 6735445) in view of **Sharony et al** (US Patent No. 6735445).

6. Regarding **claim 4**, **Katz** teaches all the limitations in claim 3. **Katz** further teaches that the main (principle) beam has a transmit power level that is significantly greater than said transmit power level of the complementary beam (Col. 3. lines 58-62) However, Katz does not teach said smart antenna to perform said SBCBF by transmitting a detectable power level in all smart antenna directions and also maintain the shape of the main beam. In an analogous art, **Sharony** teaches a transmitting energy at a detectable transmit power level in all smart antenna-supported directions (Col. 2, lines 13-18) while substantially preserving a shape of at least one main transmit beam (Col. 2, lines 13-18). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to combine Katz with Sharony's teaching to have a power level of the auxiliary beam in all direction to be

lower than that of the main beam to inform other users of on-going activity thereby preventing collision.

7. Regarding **claim 5**, **Katz** and **Sharony** teach all the limitations in claim 4. **Katz** further teaches that said SBCBF is operatively performed by said smart antenna that is operatively associated with a base station within a wireless communication system (Col. 5, lines 45-54).

8. Regarding **claim 6**, **Katz** and **Sharony** teach all the limitations in claim 5. **Katz** further teaches that said base station includes a Butler matrix network configured to form said at least one main beam using said smart antenna (Col. 5, lines 45-54).

9. Regarding **claim 8**, **Katz** and **Sharony** teach all the limitations in claim 6. **Katz** further teaches that said Butler matrix network is configured to provide pre-combining SBCBF (Col. 7, lines 28-45 and Fig. 3).

3. Claims **9 –12** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Katz et al.** (US Patent No. 6735445) in view of **Sharony et al** (US Patent No. 6735445) in further view of **Almqvist** et al (US Patent No. 6839573).

10. Regarding **claim 9 and 12**, **Katz** and **Sharony** teach all the limitations in claim 1. However, they fail to teach said at least one signal is operatively configured to cause

said smart antenna to perform subspace complementary beamforming (SCBF). In an analogous art, Almqvist teaches a method of generating an intended sidelobe as a power addition (Col. 4, lines 34-50). Therefore, it would have been obvious for one of ordinary skill in the art for one of ordinary skill in the art at the time of invention to add the sidelobe creation to make the main beam more detectable due to the additional power of the sidelobe. 12. With further regard to **claim 12**, the said at least one signal includes N-K data streams inherently operatively configured to cause said smart antenna to transmit energy in at least one side lobe.

11. Regarding **claim 10 and 11**, **Katz**, **Sharony and Almqvist** teach all the limitations in claim 9. **Almqvist** further teaches: determining said at least one signal by selectively modifying/expanding a size of a weight matrix to operatively support said SCBF. (Col. 5, lines 43-48 and lines 60-64).

12. **Claims 32 and 33** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Katz et al.** (US Patent No. 6735445) in view of **Sharony et al** (US Patent No. 6735445) in further view of **Bevan** et al.(US Patent No. 6891897).

13. Regarding **claim 32**, **Katz** teaches all the limitations in claim 1. However, Katz fails to teach that said a zero-forcing beamformer is used to output said at least one signal. In an analogous art, **Bevan** teaches that multiple receive antennas from individual transmit antennas may spatially separated at the receiver using a form of antenna spatial `nulling' call zero-forcing (col. 3, lines 43-48). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was

made to combine Katz with Sharony's teaching to add the zero-forcing method to distinguish the signal more easily.

14. **Claim 33** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Katz et al.** (US Patent No. 6735445).

15. Regarding **claim 33**, **Katz** teaches all the limitations in claim 1. Although Katz does not teach outputting said at least one signal suitable for causing said smart antenna to transmit at least one complementary beam further includes: using a maximum SINR beamformer to output said at least one signal. It is practical to utilize beamformer with a maximum SINR to ensure the best quality. Therefore it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to modify Katz teaching to have a maximum SINR beamformer to enable best signal quality.

16. Regarding claims 41-46, 48-52 and 72-73, they are rejected for the same reasons as 1-6,8-12, and 32-33 respectively. Therefore they are rejected for the same reasons 1-6,8-12, and 32-33.

Allowable Subject Matter

17. Claims 7, 12, 17-31, 34-40, 47, 52,57-71, and 74-80 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung Lam whose telephone number is (571) 272-6497. The examiner can normally be reached on M - F 8-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on (571) 272-7922. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DL

9/6/2005

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LESTER G. KINCAID
SUPERVISORY PRIMARY EXAMINER